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Central Intelligence Agency

Washington, D.C. 20505

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(2) Annotated

17 APR 1985

The Honorable Lionel H. Olmer
Under Secretary for International Trade
United States Department of Commerce
Washington, D.C. 20230

Dear Lionel,

As I promised in our January conversation, I'm sending you a summary of the key conclusions we have reached on the accuracy of our estimates of Soviet economic growth. A statement summarizing our findings is attached, and a technical report presenting the results in detail is planned for publication around the middle of the year. [redacted] 25X1

The starting point for our study is the description of our methods of estimating Soviet economic growth published in 1982 by the Joint Economic Committee of Congress. That document included discussions of the accuracy of major components of the estimates, but its primary emphasis was on measurement methods. The present review of potential sources of error in our estimates draws on that earlier work but shifts the focus onto the issue of accuracy.

[redacted] 25X1

Several other recent and longer-term considerations--with which you are familiar--contributed to our decision to report on how accurately we can measure Soviet economic growth:

- The panel of economic experts that reviewed our estimates for the President's Foreign Intelligence Advisory Board recommended that we "make more of an effort to establish an upper and lower bound for the possible error" in our growth measures.

- In a separate paper prepared for the PFIAB at your request, Michael Boretsky claimed that our growth estimates are seriously biased downward.

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[redacted] 25X1

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The Honorable Lionel H. Olmer

More recently, there has been a development with which you may not be familiar. A working group of knowledgeable academics appointed by the DDI concluded that our growth estimates are if anything overstated. 25X1

Our analysis indicates that estimated growth of Soviet GNP may be understated slightly, but not by more than half a percentage point per year and probably by less. Estimates for some individual components of GNP are subject to greater error than the summary measure, but individual errors in opposite directions help reduce the overall error. 25X1

The most important sources of error leading to the small net understatement in our estimates of GNP growth probably are:

- Some understatement of growth in industries like chemicals and construction materials, where improvements in the mix and quality of products are not fully captured by our estimates.
- Some overstatement of machinery growth because our estimates rely heavily on official Soviet measures that probably exaggerate improvements in quality, especially for new products.
- A slight understatement in growth of consumer services, mostly because our estimates do not allow for modest improvements in the quality of housing. 25X1

Some of the errors in our estimates of Soviet economic growth result from problems that affect even countries with good, open statistical systems. Improvements in quality, for example, cannot be taken into account fully without knowing and assessing a wide range of product characteristics. 25X1

Although we find that our estimates of Soviet GNP growth are probably understated somewhat, the errors are much less important than Boretsky maintains. His efforts to extend our samples and methods of estimation from the USSR to the US and the Federal Republic of Germany are interesting. We believe, however, that these extensions reflect more on the poor match between the Soviet product sample and output in these countries than on the accuracy of our measures of Soviet economic growth. 25X1

Finally, we should correct for the record Boretsky's impression that our estimates of Soviet defense spending are derived from our estimates of GNP growth ("The Tenability of CIA Estimates of Soviet Economic Growth," July 1983, pages 35-36). Defense spending is estimated independently by costing a detailed list of the physical elements of Soviet defense programs. 25X1

The Honorable Lionel H. Olmer

We will forward a copy of our full report when it is completed. In the meantime, we stand ready to discuss our work with members of your staff as you deem appropriate. [redacted] 25X1

Sincerely,

[redacted] 25X1

Deputy Director of Soviet Analysis

Attachment:
As stated

The Honorable Lionel H. Olmer

Distribution:
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DDI/SOVA/DEIG/DEA/DE [redacted] 17 April 1985

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Attachment

TESTS OF CIA MEASURES OF SOVIET ECONOMIC PERFORMANCE

BACKGROUND

The Soviets publish statistics on net material product, a measure similar to gross national product (GNP). This official measure, however, is not fully comparable with GNP estimates for Western countries. Net material product has three major shortcomings that lead us to develop independent estimates of Soviet GNP:

- o Most services--aside from freight transportation and wholesale and retail trade--are excluded.
- o Output is said to be valued in constant prices, but those prices include a substantial degree of disguised inflation.
- o Methods used to derive the official measure are not described adequately.

Our independent estimates of Soviet economic performance are intended to remedy these shortcomings and to achieve comparability with Western measures of GNP. [redacted] 25X1

Outside reviewers often have commented, sometimes critically, on our estimates of Soviet GNP and its growth. In an assessment requested by the President's Foreign Intelligence Advisory Board (PFIAB), a panel of economic experts found our estimates "calculated with essentially state-of-the-art methodology and with a high level of skill, attention to detail, and sophistication." At the same time, however, the panel recommended that we "make more of an effort to establish an upper and lower bound for the possible error" in our growth estimates. And a separate paper prepared by Michael Boretsky for the PFIAB ("The Tenability of CIA Estimates of Soviet Economic Growth," July 1983) charged that our measurement techniques impart serious downward bias to growth as we estimate it. [redacted] 25X1

The present summary of our analysis of our own accuracy in estimating Soviet GNP growth attempts to address both the recommendation of the expert panel and the major issues raised by Boretsky. In examining potential sources of error, we seek to assess the direction--especially any bias upward or downward--and rough size of their effects. The data themselves, most of which come from Soviet open sources, are assumed accurate except when there is evidence to the contrary. [redacted] 25X1

MEASUREMENT OF ECONOMIC GROWTH

To estimate growth of Soviet GNP, we start from a base year (1970) for which information is as complete and detailed as possible. Our goal is to measure growth of real value added--that is, growth of income-producing

activities, excluding the effects of price changes. Value added consists of total income generated by primary inputs to production: labor, capital, and land. Inputs of processed goods and services from producing enterprises are excluded because each product must be counted only once, rather than as many times as it is bought or sold. Growth is estimated for the producing sectors in which value added originates, or sectors of origin. Industry, agriculture, and construction produce material goods, while service sectors include transportation and trade as well as consumer and government services. [redacted] 25X1

The accuracy of our estimates of GNP growth depends mainly on how well changes over time are measured for the major sectors of origin. To estimate growth of GNP, we must rely on samples and assume that activities we cannot observe grow at the same rate as something we can observe. The key problems of measuring changes over time can be grouped in three categories:

- Finding samples of products that cover the full range of output in each sector of origin.
- Allowing for changes in the mix and quality of products in the samples.
- Choosing proxies for value added when its growth cannot be measured adequately. [redacted] 25X1

ADEQUACY OF SAMPLES

Products omitted from the samples we use in estimating Soviet economic growth may grow at different rates than the products included. We try to minimize resulting errors by making the samples as complete and representative as possible. Despite our efforts, however, there are gaps in coverage, especially of activities about which the Soviets are sensitive. And in a number of cases the samples do not capture introduction of new products, so growth is understated. [redacted] 25X1

The coverage of our samples in the base year can be measured with fair precision for three sectors that together comprise roughly three fifths of GNP:

- About 60 percent of output in industry.
- About 90 percent of output in agriculture.
- About 90 percent of employment in transportation.

In addition, we believe that base-year coverage of trade and services is nearly complete. [redacted] 25X1

Traditionally, the Soviets have published little or no information on industries related to national security--notably military machinery, nonferrous metals, and some chemicals. Wherever possible, data estimated by analysts fill gaps in coverage of products like these. Moreover, since the mid-1970s Soviet publication of data has been curtailed further. Data now

must be estimated, for example, for the grain crop and for a greater number of products in the ferrous metal, chemical, and construction materials industries. In these cases, however, the reason for curtailment appears to be concern more for covering up poor performance than for concealing security-related information. [redacted] 25X1

Although the coverage of our samples can be measured for the base year, we have no satisfactory estimates of how coverage changes over time. The most serious potential problem is that samples based on data in physical units usually fail to reflect introduction of new products. The resulting understatement in our estimates of growth is assessed in the next section, along with the effects of changes in product mix and quality. That is, we consider introduction of new products, such as plastic construction materials, as an extreme example of improvement in the quality of existing products, such as concrete or ceramic construction materials. [redacted] 25X1

CHANGES IN PRODUCT MIX AND QUALITY

On balance, improvements in the mix and quality of products probably are understated a little in our estimates of growth of Soviet GNP. For the industrial sector, however, it is uncertain whether these improvements are understated or overstated. It is likely that overstatement in machinery roughly offsets understatement in other industries--primarily chemicals and, to a lesser extent, construction materials. [redacted] 25X1

Industry. Within industry, samples of products for non-machinery branches consist primarily of data on quantities of output in physical units such as tons, items, or square meters. We value these quantities at base-year prices and calculate their average growth by branch and for industry overall. In general, quantity data do not reflect the full extent of improvements in the mix and quality of products that accompany economic growth. Nor do quantity data usually capture the introduction of new products--an extreme case of quality change. Except for official Soviet summary statistics, however, little other information is available on growth in these branches. [redacted] 25X1

Unmeasured changes in product mix and quality probably are faster for chemicals than for other industries and important for construction materials as well. Nevertheless, we are able to measure some kinds of changes. For example:

- Detailed estimates of auto, truck, and tractor output by model allow for changes in mix and introduction of new models.
- Explicit adjustments take quality change into account for cement and flour.
- Standardized units of physical measure for fertilizers, generators, and turbines implicitly reflect some changes in quality.

Moreover, in some industries average quality is declining, not increasing. Coal and iron ore are important examples. [redacted] 25X1

For machinery, unlike other branches of industry, official Soviet data on values of output in "constant" prices dominate our sample. Improvements in quality and introduction of new products are included--and almost certainly exaggerated--in these data. The main problem is that machinery producers take minor alterations of familiar models as an excuse to raise prices. Sensitivity tests suggest that the resulting likely overstatement in our estimates of machinery growth roughly offsets the understatement in our growth estimates for other industries. [redacted] 25X1

Housing. Outside industry, growth of housing probably is underestimated because our measure is based on living space. Data that would permit adjustment for quality change simply are not available. [redacted] 25X1

GNP Overall. Therefore, we judge that our estimates of Soviet GNP growth are likely to understate improvements in product mix and quality, but not by much. Even in Western countries, however, measures of economic growth generally do not capture the full extent of quality change. Reliable value data, which we lack, allow Western statisticians to include changes that we miss, but only if their costs can be measured. [redacted] 25X1

PROXIES FOR VALUE ADDED

Our estimates of growth of Soviet GNP are intended to reflect trends in real value added, which is difficult to measure. For agriculture, we use the procedure preferred by most Western statisticians when accurate data are available. Growth is estimated first for gross output--including inputs of goods and services processed by other sectors--and then growth of processed inputs is removed. For other sectors of origin, however, data limitations are such that we use proxies for value added. All of these proxies are common in Western statistical practice, but we resort to them more often because data are more limited for the USSR. [redacted] 25X1

Depending on the sector of origin, our estimates of GNP growth are based on several proxies for value added:

- Gross output, including processed inputs, for industry, transportation, and trade.
- Labor inputs, measured in work hours, for all government services and some other services.
- Processed inputs for construction. [redacted] 25X1

Most Western statisticians prefer to use gross output as a proxy rather than calculate value added itself unless the accuracy of data on both outputs and inputs is high. Because value added is calculated as a difference, it is subject to larger errors of measurement than the output and input data from which it is derived. (See T.P. Hill, The Measurement of Real Product, Paris, Organization for Economic Cooperation and Development, 1971, chapter II.) US

estimates of GNP originating in industry are based on trends in value added itself. The Federal Reserve Board's index of US industrial production, however, is based on trends in gross output. Both measures show similar changes over time. [redacted] 25X1

We are fairly close to standard Western statistical practice in using labor inputs as a proxy for value added in government services. Our estimates for health, credit and insurance, and other miscellaneous services also are based on labor inputs. This departs from Western practice, but little other information is available on these services in the USSR. [redacted] 25X1

NET EFFECT OF ERRORS

The net effect of the various sources of error, both positive and negative, on our measures of Soviet GNP growth probably is a slight understatement. Our analysis indicates that this error is not likely to exceed half a percentage point per year and is more likely to be smaller. Even if the larger error persisted for 15 years, the level of GNP at the end of the period would be understated by less than 10 percent. This would not alter the order of magnitude of our judgments about the relative sizes of the US and Soviet economies. Most of the impact of errors falls on estimates for two major sectors of origin:

- Industry, where errors upward and downward roughly balance. Growth could be either overstated or understated by about half a percentage point per year.

- Services, where growth is likely to be understated, but by less than a percentage point per year. [redacted] 25X1

BORETSKY'S RESULTS

Michael Boretsky argues that our estimates of Soviet economic growth are seriously biased downward. His major criticisms, which involve the key problems of measuring changes over time, are that:

- Our samples do not represent the range of Soviet output adequately.

- Our use of data in physical units fails to reflect improvements in the quality of products.

- Our labor input proxy for value added in government and some other services understates growth in those sectors.

Samples. Our efforts to fill gaps in data are evidence that we do not, as Boretsky charges, limit samples to "data the Soviets choose to publish." For some goods--such as grain, nonferrous metals, oil products, and military machinery--we try to fill gaps in published data with our own estimates, but the degree of accuracy cannot be ascertained. Another issue raised by Boretsky amounts to an indirect criticism of our samples. He extends the samples and methods we use for the USSR--with some adaptations--to

calculations of GNP growth for the US and the Federal Republic of Germany (FRG). These calculations result in growth rates lower than the official statistics of the two countries, leading him to fault our application of the samples and methods to the Soviet case. 25X1

But Boretsky's inference does not follow from his analysis. Although we would agree that our samples represent the range of output in the US and FRG only poorly, this does make them inadequate for the USSR. The Soviet economy differs greatly from advanced Western economies in structure, level of development, and general system. Even within a single country, the range of output can change appreciably over a long interval of time. For example, electronic consumer goods were unavailable twenty years ago in the US. And countries at different levels of economic development are likely to produce outputs that differ as much as those of a single country over many years. 25X1

Quality improvements. Boretsky criticizes the extent to which we rely on quantity data without mentioning our efforts to include as many changes in product mix and quality as information permits. He would prefer that we estimate real growth by using price indexes to deflate current values of output. Neither price indexes nor current values, however, are available in enough detail to make this approach feasible. Moreover, Boretsky ignores our reliance on Soviet value data in "constant" prices for a large and rising share of machinery. His picture of potential sources of error in our estimates of GNP growth is therefore unbalanced, focusing on sources of downward bias but omitting counter sources of upward bias. 25X1

Labor inputs. Our measurement of labor inputs to services--in work hours unadjusted for gains in labor productivity--incurs Boretsky's criticism. For government services, adjustments for labor productivity are not common in Western countries, whose methods we try to follow. The remaining services for which we use work hours are a small share of Soviet GNP, and labor productivity for them is likely to have grown only slowly. If we did adjust for labor productivity in these services, the effect on our estimates of GNP growth would be slight. 25X1

OTHER POINTS

Boretsky also argues that our measures of Soviet GNP growth in the 1950s and early 1960s are too low compared with estimates obtained in earlier Western studies. Some of those studies (by Moorsteen and Powell and by Kaplan) followed methods similar to ours but started from earlier base years. Much of the explanation for our lower estimates of growth is provided not by differences in samples or methods, but by our use of a more recent base year. As economic theory leads us to expect, the faster that output of a product grows--say output of calculators or computers--the cheaper it is likely to become relative to other products. Shifting to prices of a more recent base year therefore reduces the weights of faster-growing products. 25X1

Other earlier studies (Bergson's and Becker's) used methods different from ours. Their higher estimates are explained mostly by their reliance on official Soviet price indexes to convert growth in current values to real

growth. Because Soviet price indexes understate inflation, the resulting estimates of real growth almost surely are overstated. At the time of the studies, however, alternative procedures were not available. [redacted] 25X1